A Systems Approach on Social Enterprise

A workshop towards Multiple Perspective Learning

David Ing

Trito Innovation CoLab

http://coevolving.com

Agents of Change program

July 11, 2018

Centre for Social Innovation

Toronto, Ontario

Image CC-BY-SA: Celina Laurette (2017) *Escaping from Plato's Cave*

Social Enterprise

A *social enterprise* is *an organization* that uses *business strategies* to maximize its *social* or *environmental impact*.

Ministry of Economic Development and Growth. 2015. “Impact: A Social Enterprise Strategy for Ontario.” *Government of Ontario*. December 14, 2015. https://www.ontario.ca/page/impact-social-enterprise-strategy-ontario

The Systems Approach … and its Enemies

… the *systems approach* belongs to a whole class of approaches to managing and planning our human affairs with the intent that we as a living species conduct ourselves properly in this world. [p. 7]

… these enemies provide a powerful way of learning about the systems approach, precisely because they enable the rational mind to step outside itself and to observe itself [p. 24]

Churchman, C. West. 1979. *The Systems Approach and Its Enemies*. New York: Basic Books.

Agenda

A. Outline + introductions

B. Learning-by-trying (in a timebox): Multiple Perspectives Learning

C. Continuing our learning

Appendix

David Ing, Professional Experience

Circa 1964,
Gravenhurst, Ontario, Canada

View the book launch slides

The book launch on February 21, 2018, was coordinated with the monthly Systems Thinking Ontario meeting at OCAD University. The event was promoted on Eventbrite.

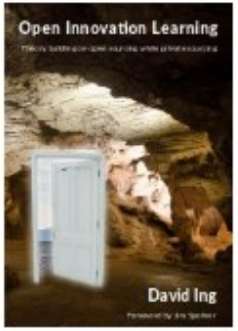
The presentation slides (including source files) are available on the Coevolving Commons.

Watch the book launch video playlist

An outline of the event is described on the Coevolving Innovations blog.

Get the book

Open Innovation Learning: Theory-building on open sourcing while private sourcing, CC-BY-SA 2017, 2018 David Ing; preface by Jim Spohrer.



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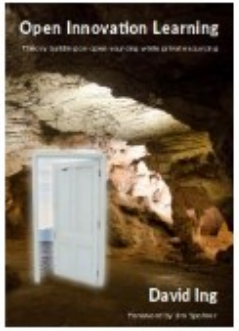

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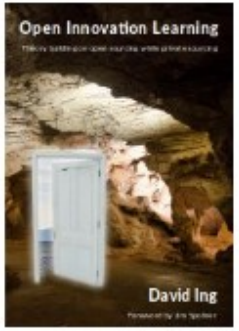

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The canonical version of the book is now the ePub3 version. The text and diagrams are easier to read on a tablet than the A4 PDF. This version embeds tables and scalable vector graphics (SVG), which may not be rendered perfectly on all devices.

- On a desktop computer, ...
  - Kobo Desktop App renders perfectly on MacOS and Windows.

This workshop contributes towards open sourcing research

Research		*Consulting*
Many-to-many Pooled knowledge community	relation	**One-to-one** Focused bandwidth
Open sourcing Creative Commons licensing	visibility	**Private sourcing** Trade secrets, copyrights
Free (as in liberty) Non-exclusionary	access	**Privileged (permissioned)** Negotiated conditions
Free (as in gratis) Shared investment	economics	**Fee (for consideration)** Gradient in value

Workshop participants self-introductions

Who … is your organization?
… are the members here, today?

Why … will the world value your organization's contribution?

What … do you need to learn over the next 3 months to be successful?

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1. An exercise:
   a dockless bike sharing system
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4. Dynamic stability (positioning), voices, affording values
5. Offerings, value constellations, co-responding

With known knowns in science eroding by systemic world changes, collective learning on why, how + when-where-whom gains value

Colloquial description:	**Learning why**	**Learning how**	**Learning when, learning where, learning whom**
Pursuits:	Uncovering universal truths	Instrumental rationality towards a conscious goal	Values in practice based on judgement and experience
Primary intellectual virtue:	**Episteme**	**Techne**	**Phronesis**
Translation / interpretation:	Science (viz. epistemology)	Craft (viz. technique)	Prudence, common sense
Type of virtue:	Analytic scientific knowledge	Technical knowledge	Practical ethics
Orientation:	Research	Production	Action
Nature:	Universal	Pragmatic	Pragmatic
	Invariable (in time and space)	Variable (in time and space)	Variable (in time and space)
	Context-independent	Context-dependent	Context-dependent

[1] Ing, David, Minna Takala, and Ian Simmonds. 2003. "Anticipating Organizational Competences for Development through the Disclosing of Ignorance." In *Proceedings of the 47th Annual Meeting of the International Society for the System Sciences*. Hersonissos, Crete. http://systemicbusiness.org/pubs/2003_ISSS_47th_Ing_Takala_Simmonds.html

[2] Ing, David. 2013. "Rethinking Systems Thinking: Learning and Coevolving with the World." *Systems Research and Behavioral Science* 30 (5): 527–47. doi:10.1002/sres.2229.

In transdisciplinary work, change may lead scientific narratives to be more robust than models

In a [scientific] narrative, a series of dynamic happenings are transformed into rate-independent events.

Narratives in science are not about the verity of facts, but are explicitly about what the narrator considers important. The storyteller says which part of the infinitely rich dynamics of full material change is worthy of becoming a named event. Narratives are ordered according to the preferences of the narrator, and account for experience and relationships in explicitly subjective terms.

Narratives help us make up our minds. Context gives meaning. An earlier part of the story can create a context for a later part of the story, thus changing the meaning of that latter part from what it would have been in isolation. In this way, narrative tracks events as they unfold, and so reflect a process of the world becoming.

Narrative gives a point of view. In narratives, there is often tension between the focal attention at a point in the story and the tacit attention of the context to that point ...

Narratives need not be internally consistent, in the way that models should be. This makes narratives more robust than models, because they are still in business when things change to the point of contradiction.

In scientific narrative, there may be multiple causalities, without the narrative failing.

The power of narratives is in their ability to make experience commensurate for those who tell and hear the tale. Narratives do this by working on how the various parties feel about the issue at hand.

Allen, Timothy F. H., and Mario Giampietro. 2006. “Narratives and Transdisciplines for a Post-Industrial World.” *Systems Research and Behavioral Science* 23 (5): 595–615. https://doi.org/10.1002/sres.792.

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Let's create a narrative about a dockless bike-sharing system (for Toronto)

Hotel Ocho_10, CC-BY Amanda Sherrington 2014,
https://www.flickr.com/photos/100841676@N04/15649620387/

Tongji U, CC-BY-NC-SA David Ing 2017,
https://www.flickr.com/photos/daviding/33828827286/

Meet Mobike, a billion-dollar bike-sharing startup from China

Jon Russell @jonrussell / Jul 12, 2017

During our recent TechCrunch China event in Shenzhen last month, we took time out to get to know Mobike, one of the leading bike on-demand companies, and sample the bikes it offers.

The company was founded in 2015, and today it claims over 100 million registered users across more than 100 cities, almost all of which are in China.

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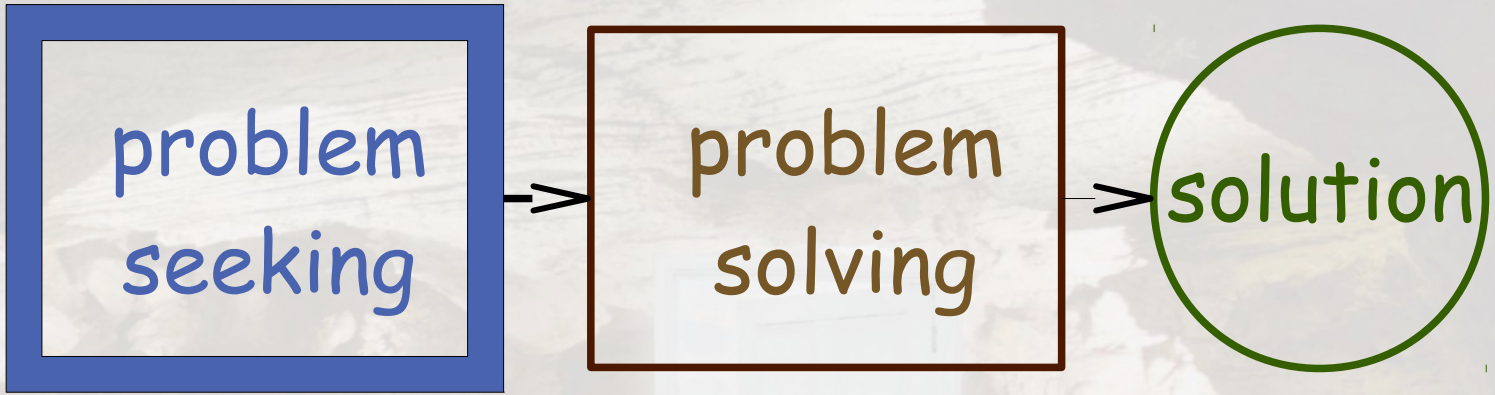
In 1969, problem seeking was *architectural programming*, and problem solving was *design*

Programming is a specialized and often misunderstood term. It is "*a statement of an architectural problem* and the requirements to be met in offering a solution. While the term is used with other descriptive adjectives such as *computer* programming, *educational* programming, *functional* programming, etc., in this report, programming is used to refer only to architectural programming.

Why programming? The client has a project with many unidentified sub-problems. The architect must define the client's total problem.



Design is problem solving; programming is problem seeking. The end of the programming process is a statement of the total problem; such a statement is the element that joins programming and design. The "total problem" then serves to point up constituent problems, in terms of four considerations, those of form, function, economy and time. The aim of the programming is to provide a sound basis for effective design. The State of the Problem represents the essense and the uniqueness of the project. Furthermore, it suggests the solution to the problem by defining the main issues and giving direction to the designer (Pena and Focke 1969, 3).

Architecting and designing? Landscape and taskscape?

As a **noun**, **design** is the named (although sometimes unnamable) **structure or behavior** of an system whose presence resolves or contributes to the **resolution** of a force or **forces** on that system. […]

As a **verb**, **design** is the activity of **making such decisions**. Given a large set of **forces**, a relatively malleable set of **materials**, and a large **landscape** upon which to play, the resulting **decision space** may be large and complex. […]

All architecture is design but not all design is architecture.

Booch, Grady. 2006. "On Design." *Software Architecture, Software Engineering, and Renaissance Jazz* (blog). March 2, 2006. https://web.archive.org/web/20160213001803/https://www.ibm.com/developerworks/community/blogs/gradybooch/entry/on_design.

Architectural thinking as shaping the structure of the environment ...

The landscape is **not 'space'**.

… the **landscape** is the **world** as it is known to those who **dwell therein**, who **inhabit** its places and **journey** along the paths connecting them.

[**Temporality**] is **not chronology** ... and it is **not history** ….
I shall adopt the term **'task'**, defined as **any practical operation**, carried out by a **skilled agent in an environment**, as part of his or her **normal business of life**.

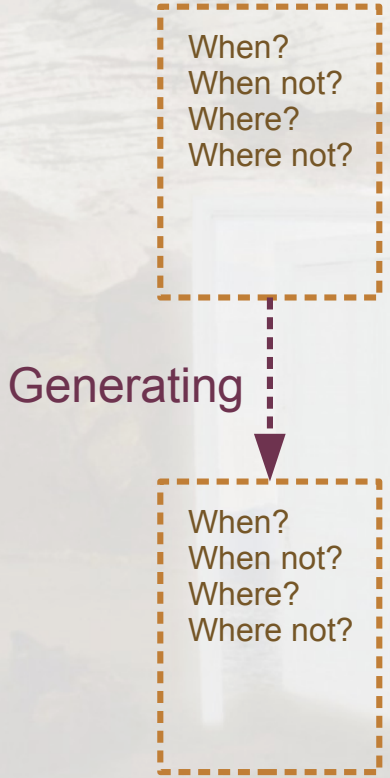
It is to the entire **ensemble of tasks**, in their **mutual interlocking**, that I refer by the concept of ***taskscape***.

Design thinking as divergent steps (i.e. creating choices) and convergent steps (i.e. making choices)

Ingold, Tim. 2000. "The Temporality of the Landscape." In *The Perception of the Environment: Essays on Livelihood, Dwelling and Skill*, 189–208. Routledge.

Systems architecting as an ecological perspective, is a landscape-timescape on which *systems designing* builds

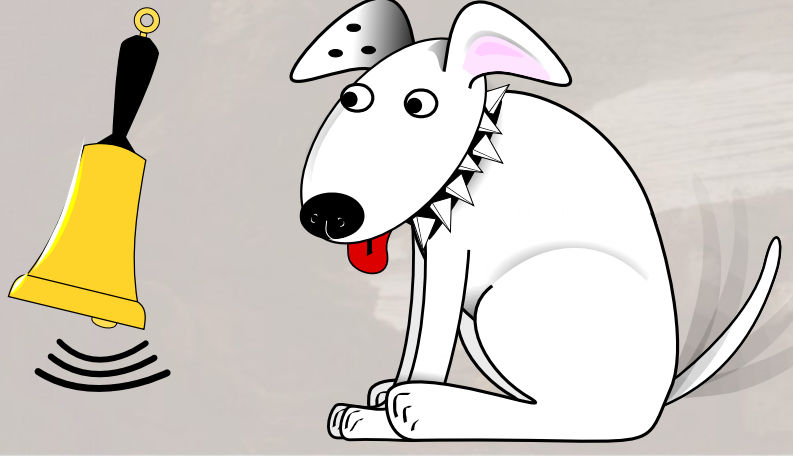
Systems Architecting
(via an Ecological Perspective)



Systems Designing
(via a Behavioural Perspective)

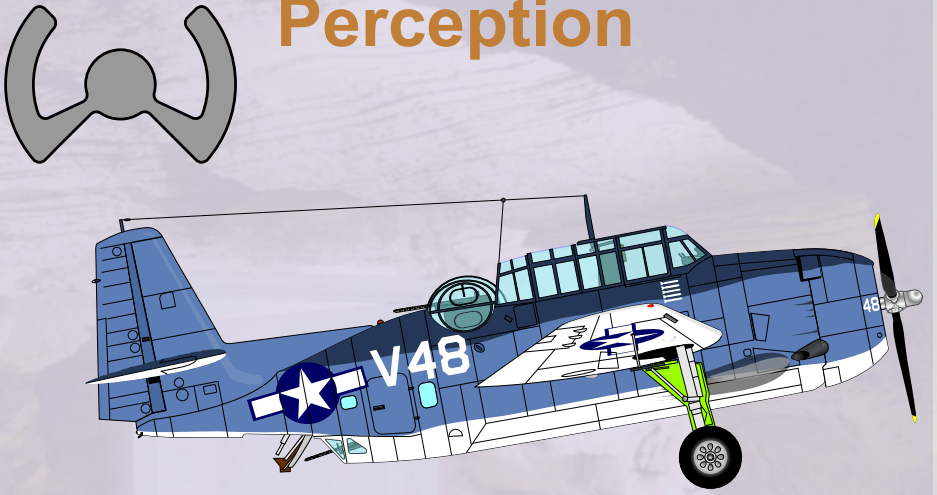
Ask Not What's Inside Your Head, but What Your Head's Inside of

Stimulus – Response
(Behavioral Psychology)



[In the 1950] psychophysics of perception … "givens" in the light to the eye could not support perceptual phenomena, but only elementary experiences such as sensations. [….] Succinctly put, the psycho-physical program was … traditional in considering perception to be a set of responses to presented stimuli (albeit "higher order" stimuli).

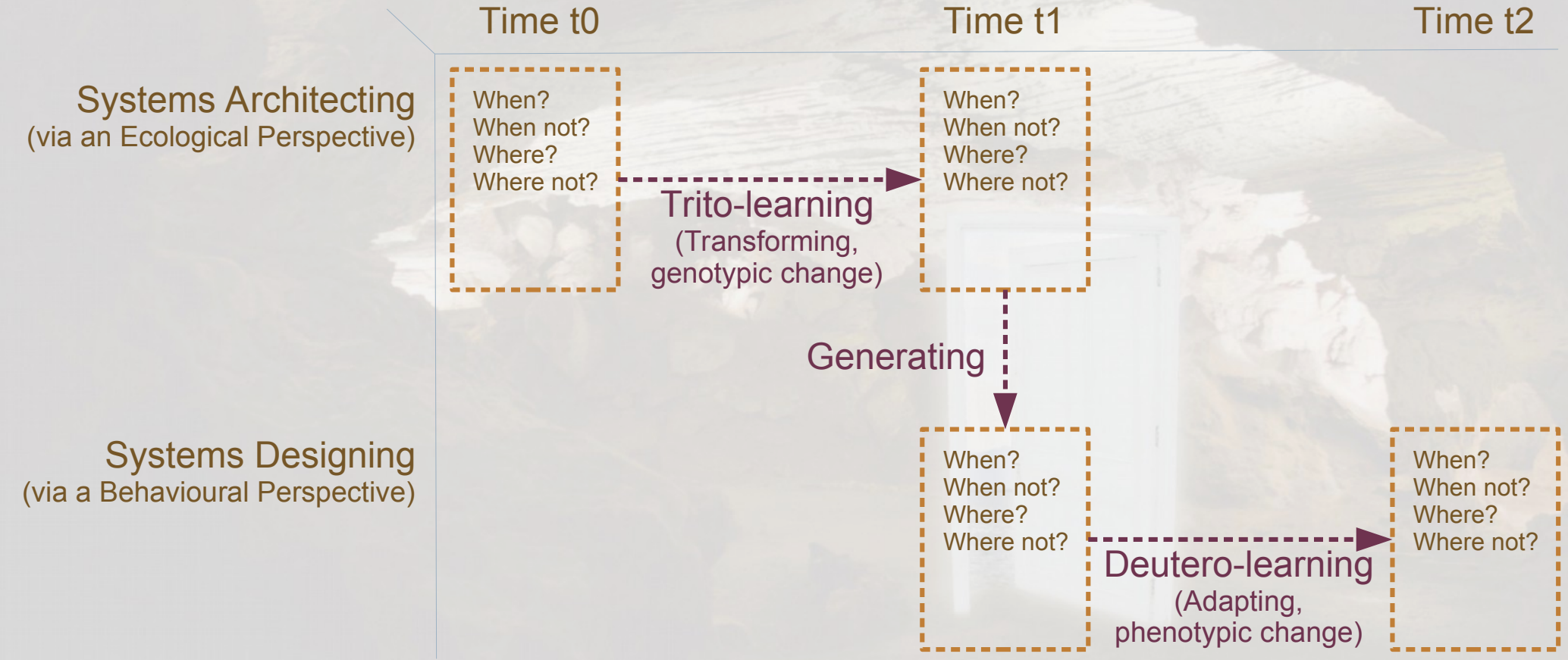
Ecological Approach to Perception



Over the last 10-15 years [James J. Gibson] has tried to develop enough theory … to demonstrate that direct perception is indeed plausible even if hordes of difficult details remain to be worked out. The … analysis of the optic array, stimulus organization, and the functional organization of perceptual systems are what Gibson oftens points to as radical features ….

William M. Mace 1977. "James J. Gibson's Strategy for Perceiving: Ask Not What's inside Your Head, but What Your Head's inside of." In *Perceiving, Acting, and Knowing: Toward an Ecological Psychology*, edited by Robert Shaw and John Bransford, 43–65.

Designing involves change as *adapting*; architecting involves change as *transforming*

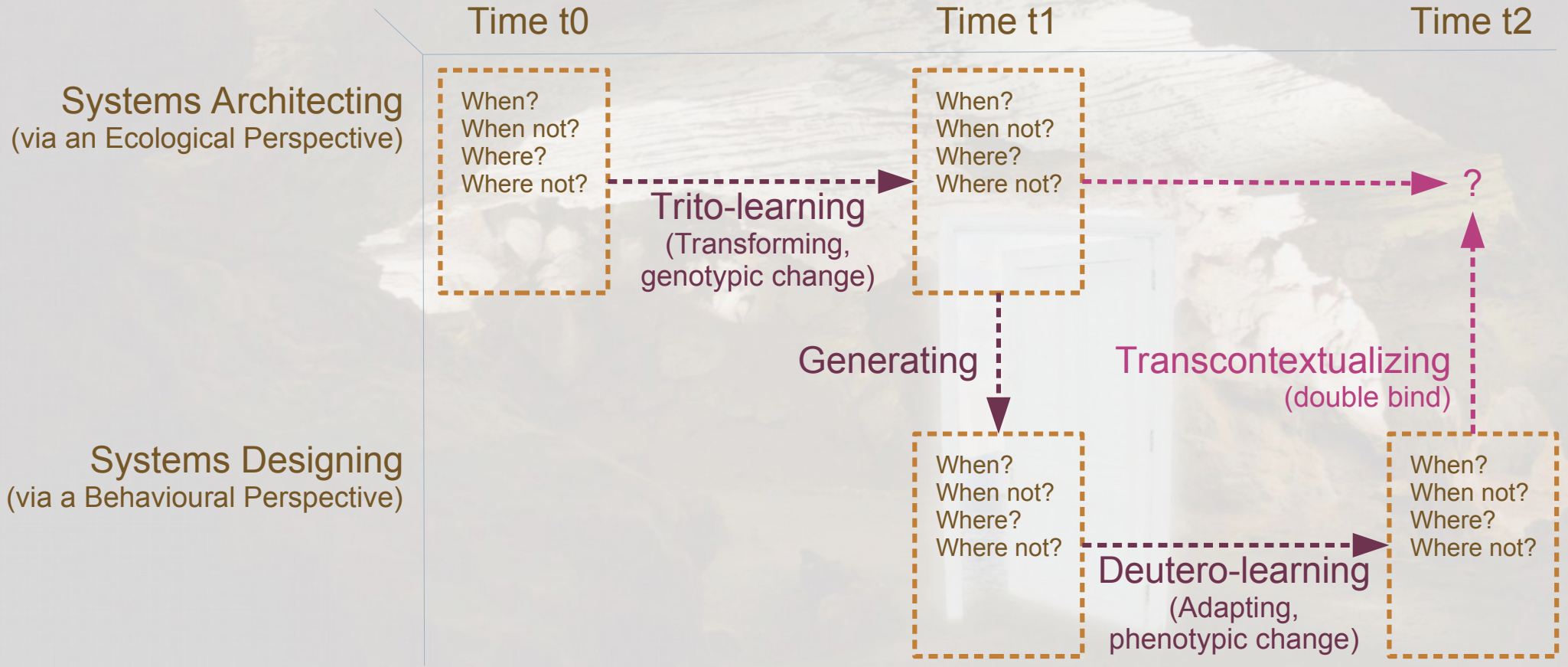


Trito Learning rolls with turbulent contexts by negotiating in worlds where proto-learning and deutero-learning break down

	Process discriminating context change over time	*Example / metaphor (groups learn to cook)*
Trito-learning (Learning 3)	Change in response correcting for contexts (i.e. systems of sets of alternatives)	Competing on tv cooking challenges as teams and individuals (e.g. Hell's Kitchen)
Deutero-learning (Learning 2)	Change in response correcting the set of alternatives	Mastering a range of food prep traditions (e.g. Culinary Institute of America)
Proto-learning (Learning 1)	Change in response correcting errors within a set of alternatives	Training on food service handling for consistency and safety (e.g. cafeteria kitchens)

Proto-learning, deutero-learning and trito-learning are described in Bateson, Gregory. 1972. “The Logical Categories of Learning and Communication.” In *Steps to an Ecology of Mind*, 279–308. Northvale, NJ: Jason Aronson.

When change overwhelms a system design, transcontextualizing may call for re-architecting



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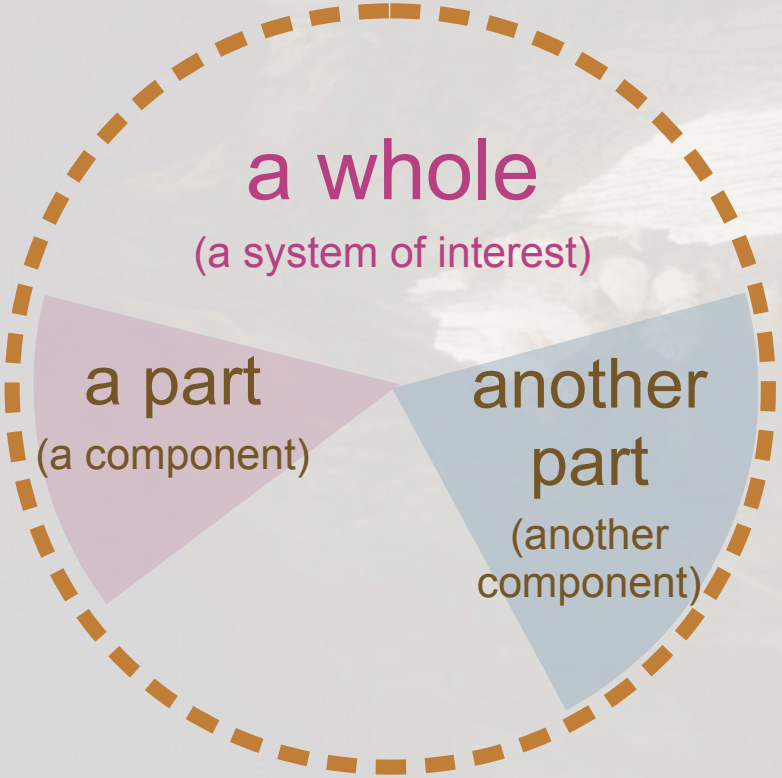
A system is a whole that cannot be divided into independent parts

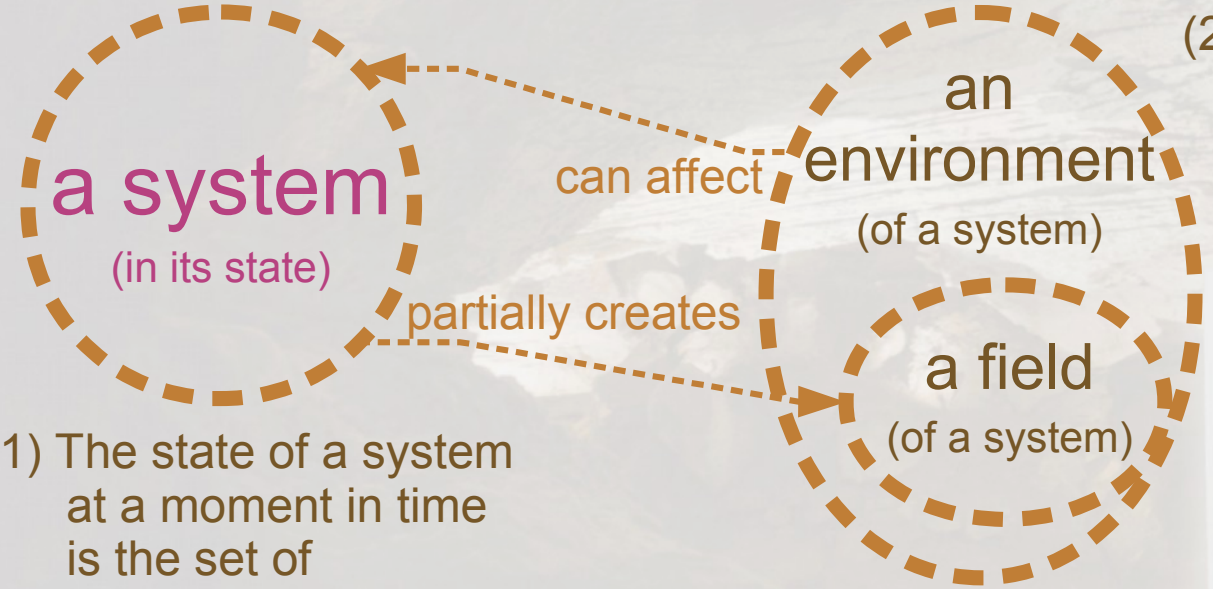


(1) Every part of a system has properties that it loses when separated from the system.

(2) Every system has some properties – its essential ones – that none of its parts do.

Ackoff, Russell L. 1981. *Creating the Corporate Future: Plan or Be Planned For*. New York: John Wiley and Sons, p. 15

An environment of a system consists of all variables which can affect the system's state



(1) The state of a system at a moment in time is the set of relevant properties which the system has at that time.

(2) An environment of a system is a set of elements and their relevant properties, which elements are not part of the system, but a change in any of which can produce a change in the state of the system.

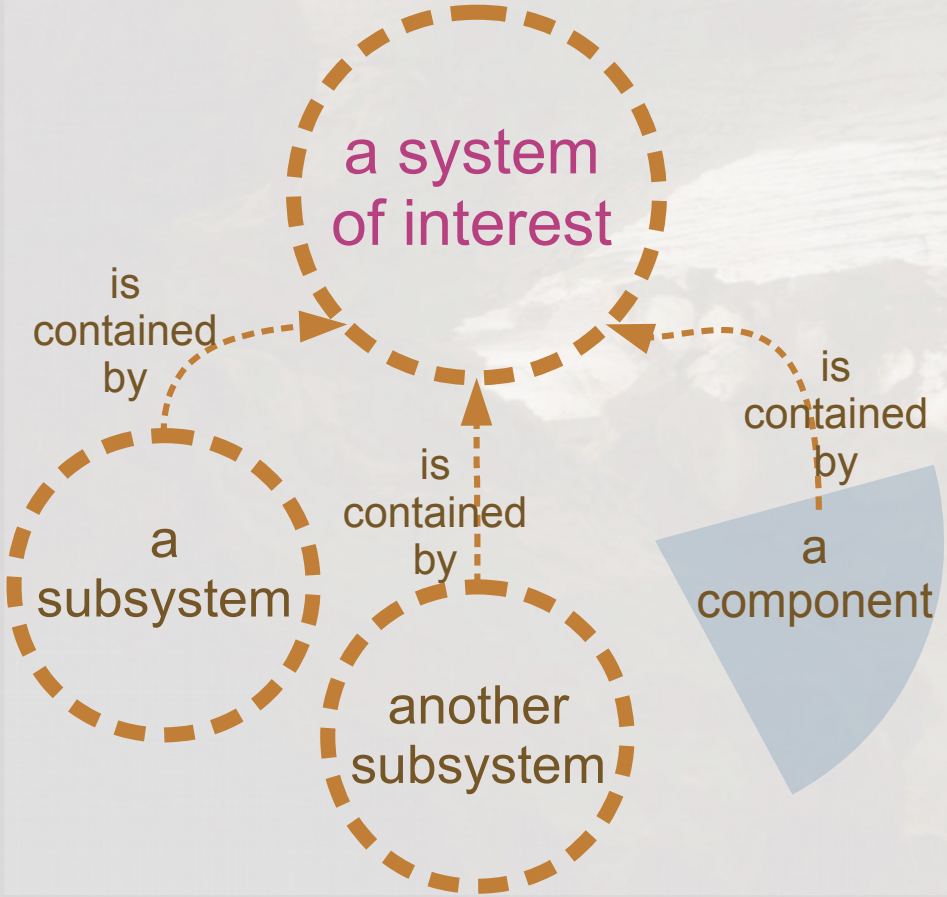
(3) External elements which affect irrelevant properties of a system are not part of its environment

(4) Field centers on the environment in which the subject organization is embedded and which is partially creates.

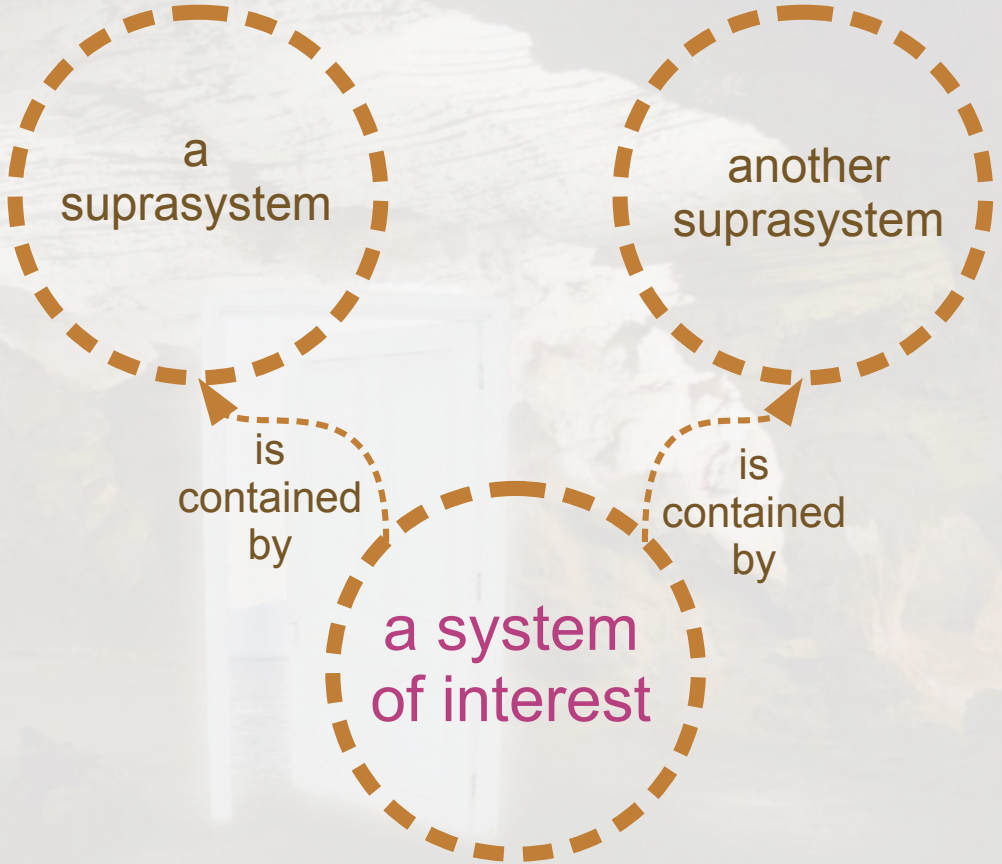
Ackoff, Russell L. 1971. "Towards a System of Systems Concepts." *Management Science* 17 (11): 661–671, (pp. 662-663)

Trist, Eric L. 1992. "Andras Angyal and Systems Thinking." In *Planning for Human Systems: Essays in Honor of Russell L. Ackoff*, edited by Jean-Marc Choukroun and Roberta M. Snow, 111–32. University of Pennsylvania Press. (p. 127)

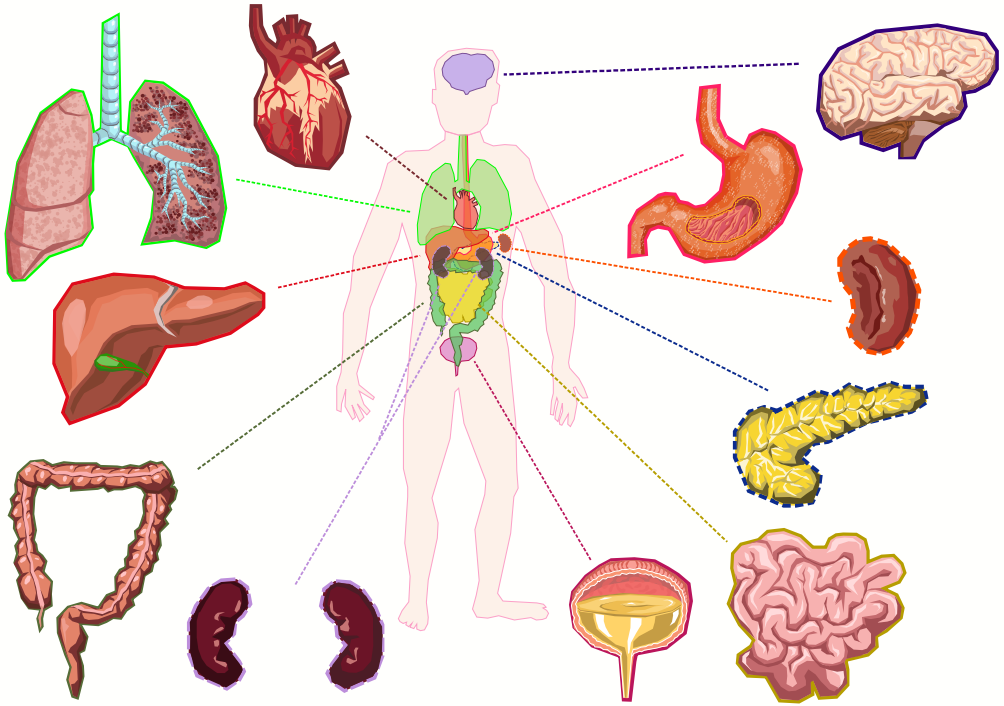
A system can contain subsystems or components

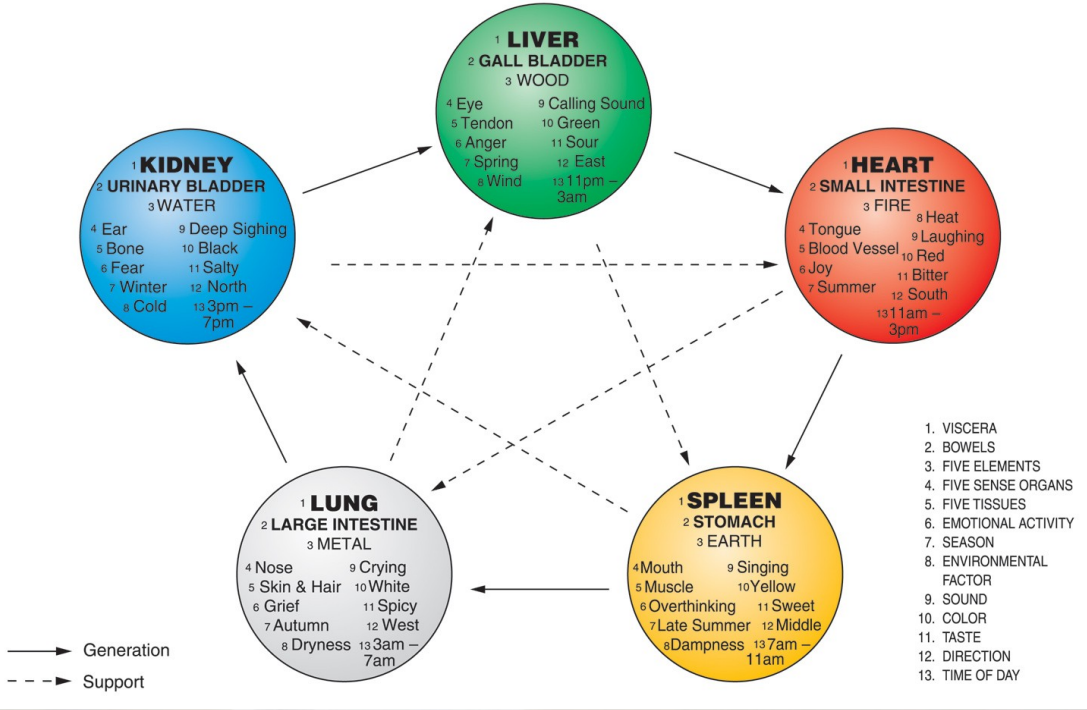


A system can be contained by multiple suprasystems



Human organs as *parts* by western physicians contrast to the *subsystems* of Traditional Chinese Medicine

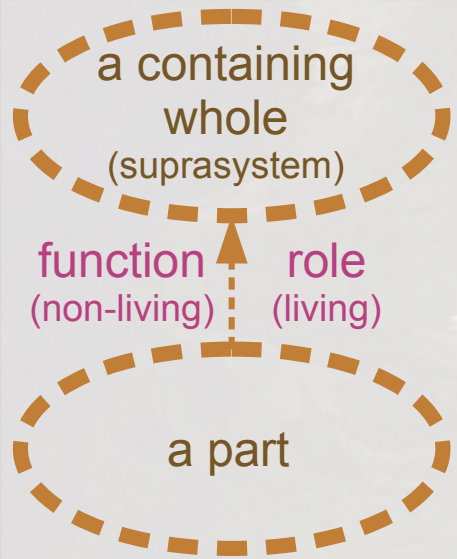




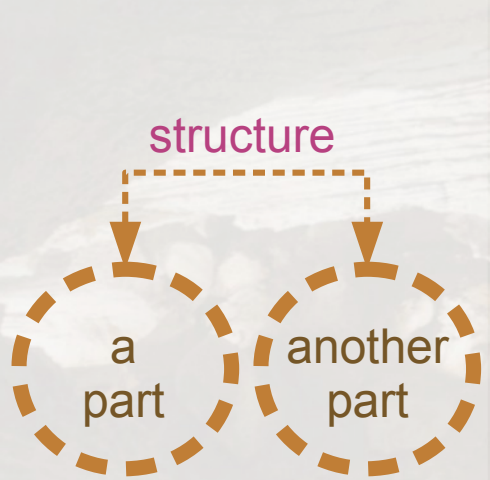
Mothsart, “Organs of the human body”, at https://openclipart.org/detail/280284/human-body

Traditional Chinese Medicine World Foundation, “Classification of things according to the theory of the five elements”, at https://www.tcmworld.org/what-is-tcm/the-five-major-organ-systems/

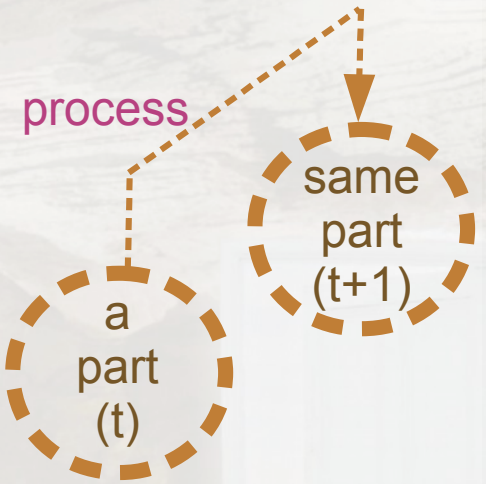
Systems thinking is a perspective on parts, wholes, and their relations



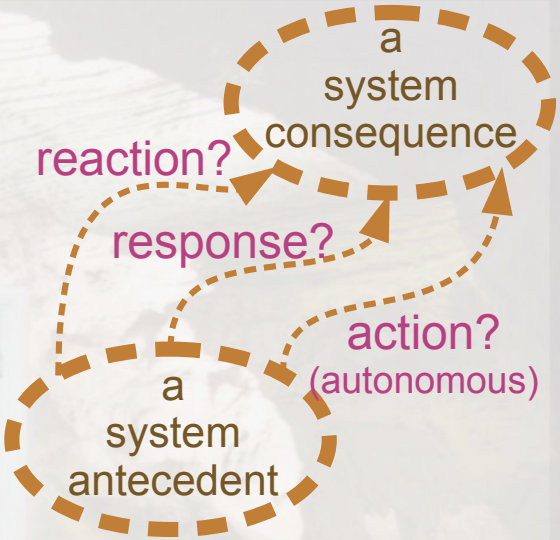
Function is a "contribution of the part to the whole"



Structure is an "arrangement in space"



Process is an "arrangement in time"



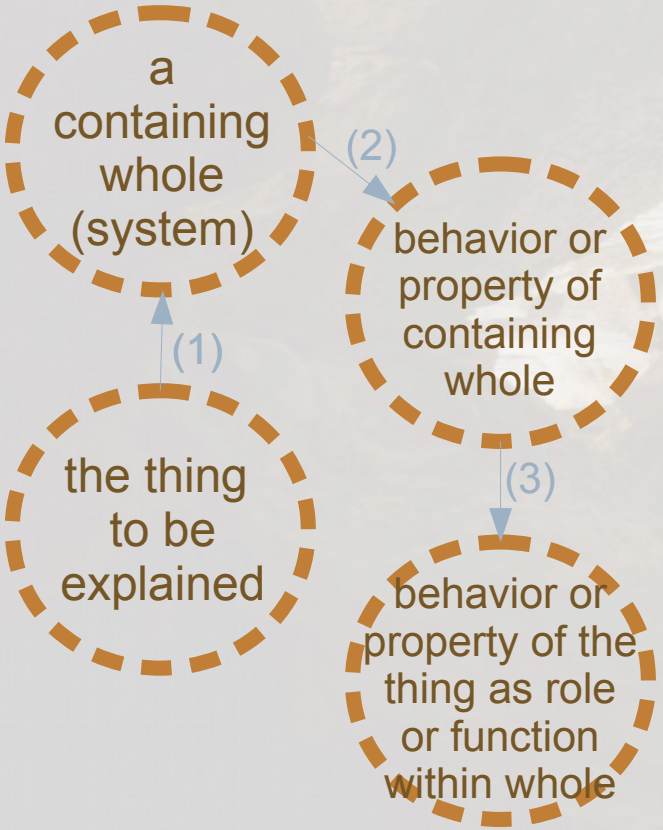
Behaviour is a "system change which initiates other events"

Ing, David. 2013. "Rethinking Systems Thinking: Learning and Coevolving with the World." *Systems Research and Behavioral Science* 30 (5): 527–47.

Gharajedaghi, Jamshid. 1999. *Systems Thinking: Managing Chaos and Complexity : A Platform for Designing Business Architecture*. Elsevier

Ackoff, Russell L. 1971. "Towards a System of Systems Concepts." *Management Science* 17 (11): 661–671.

In authentic systems thinking, synthesis precedes analysis and the containing whole is appreciated



Synthesis precedes analysis

1. Identify a **containing whole** (system) of which the **thing to be explained** is a part.
2. Explain the **behavior or properties** of the **containing whole**
3. Then explain the **behavior or properties** of the **thing to the explained** in terms of its **role(s) or function(s)** within its containing whole.

Ackoff, Russell L. 1981. *Creating the Corporate Future: Plan or Be Planned For*. New York: John Wiley and Sons, p. 16

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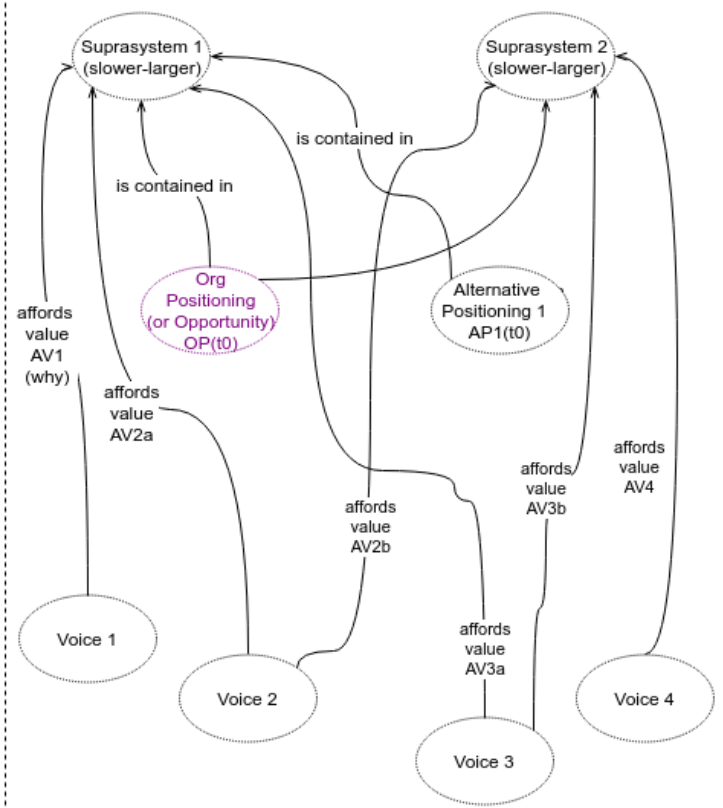
A visual narrative template is in progress (page 1 of 2)

Systems Architecting, via an Ecological Perspective

Organizational Architecting (Being)

When: ?
When not: ?
Where: ?
Where not?



↑↑ Transforming (Genotypic change) ↑↑

Organizational Architecting (Becoming)

When: ?
When not: ?
Where: ?
Where not?

Org Positioning OP(t1)

↓↓ Generating ↓↓

An organizational architecture positions for product change and process change as dynamic or static

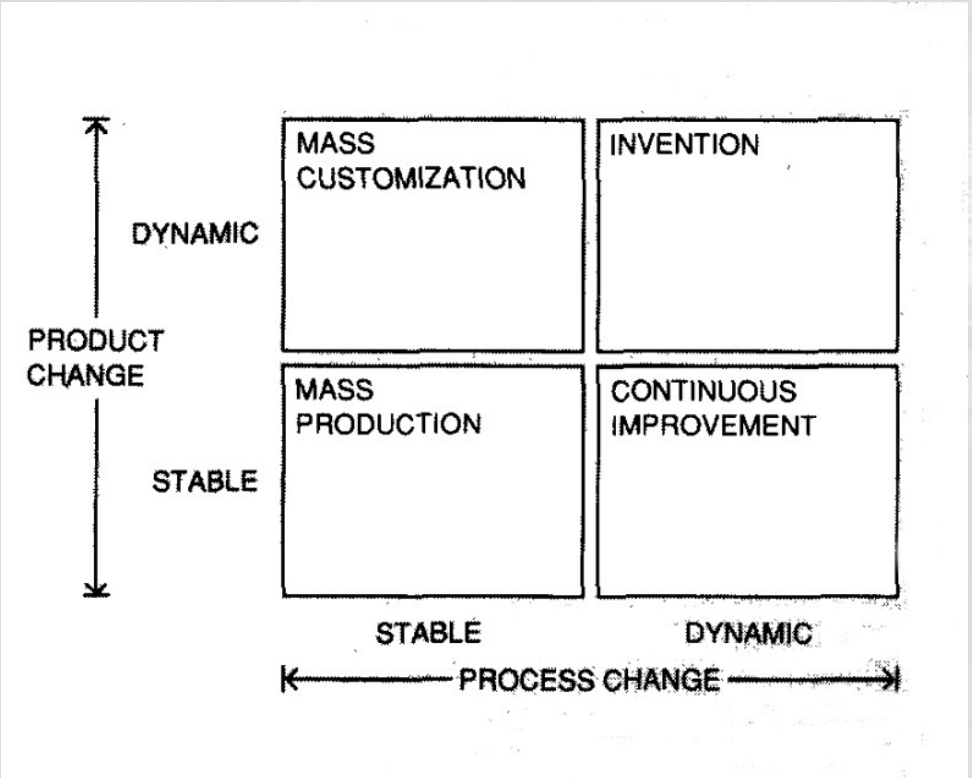


Figure 1: Product-process change matrix

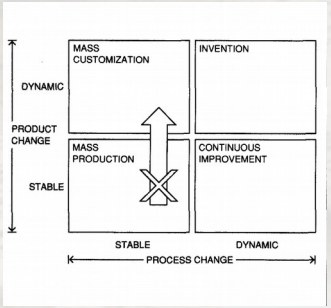


Figure 9
Making the transformation:
The wrong path

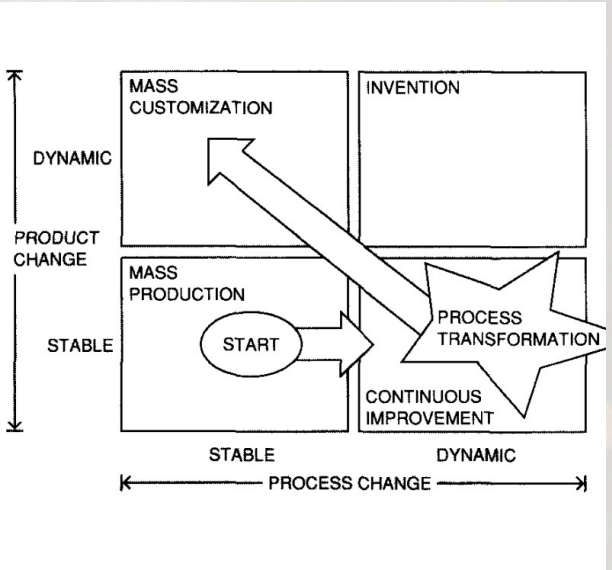


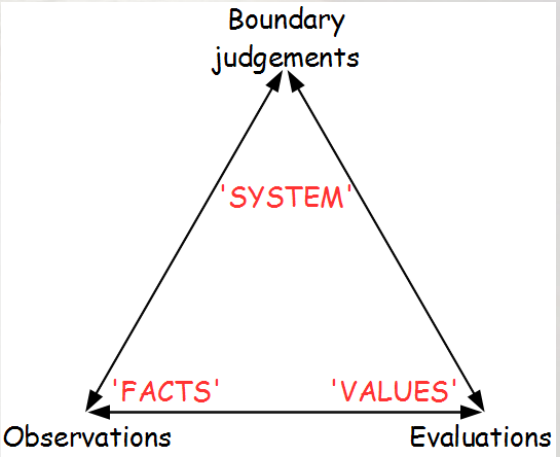
Figure 10
Making the transformation:
The right path

Boynton, Andrew C., Bart Victor, and B. Joseph Pine. 1993. “New Competitive Strategies: Challenges to Organizations and Information Technology.” IBM Systems Journal 32 (1): 40–64. https://doi.org/10.1147/sj.321.0040.

Voices that are heard (or not heard) is the concern of critical systems heuristics, with observations and evaluations considered relevant or not

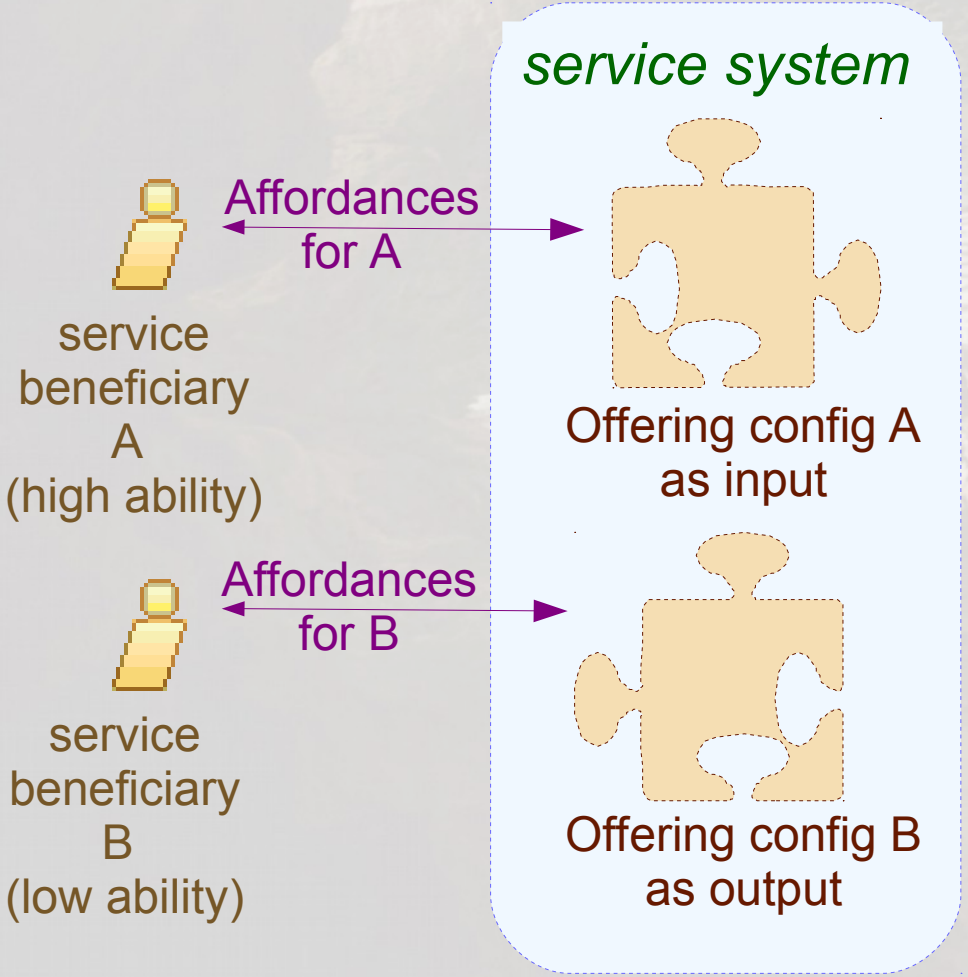
Boundary conditions	Boundary issues	
1. Client 2. Purpose 3. Measure of improvement	Sources of motivation	
4. Decision-maker 5. Resources 6. Decision environment	Sources of power	Those involved
7. Professional 8. Expertise 9. Guarantee	Sources of knowledge	
10. Witness 11. Emancipation 12. World view	Sources of legitimation	Those affected

The reference system (system of concern) that determines what observations ("facts") and evaluations ("values") are considered relevant when it comes to assessing the merits or defects of a proposition.



Ulrich, Werner. 2000. "Reflective Practice in the Civil Society: The Contribution of Critically Systemic Thinking." *Reflective Practice: International and Multidisciplinary Perspectives* 1 (2): 247. https://doi.org/10.1080/713693151.

Affordances are relational in an ecological perspective



The term ***affordance*** refers to whatever it is about **the environment** that **contributes** to the kind of **interaction** that occurs. [….]

An affordance relates attributes of something in the environment to an interactive activity by an agent who has some ability, and an ability relates attributes of an agent to an interactive activity with something in the environment that has some affordance.

The relativity of affordances and abilities is fundamental. Neither an affordance nor an ability is specifiable in the absence of specifying the other.

James G. Greeno 1994. "Gibson's Affordances." *Psychological Review* 101 (2): 336–342.

Agenda

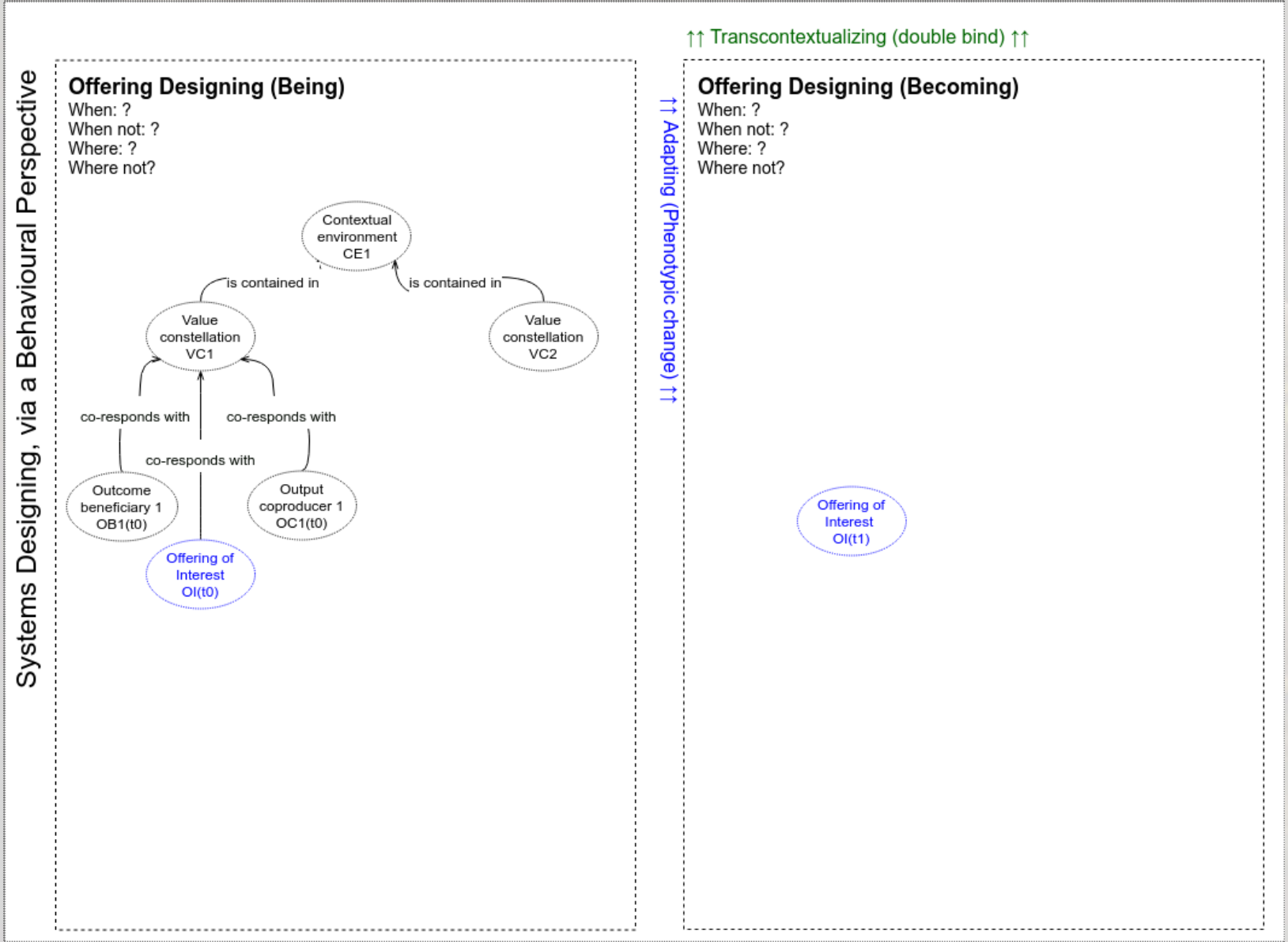
A. Outline + introductions

B. Learning-by-trying (in a timebox): Multiple Perspectives Learning

C. Continuing our learning
Appendix

1. An exercise: a dockless bike sharing system
2. Architecting, designing, learning
3. Systems basics
4. Dynamic stability (positioning), voices, affording values
5. Offerings, value constellations, co-responding

A visual narrative template is in progress (page 2 of 2)



An offering can be an output, an input or a co-creation

Offerings-output production

- Providers fix bundles of offerings from which customers select

Offerings-input coproduction

- Customers broaden the range of options through loose coupling

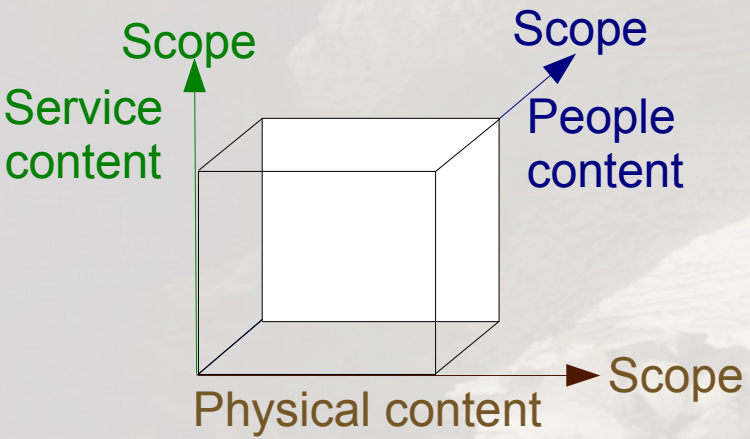
Value-elevating co-creation

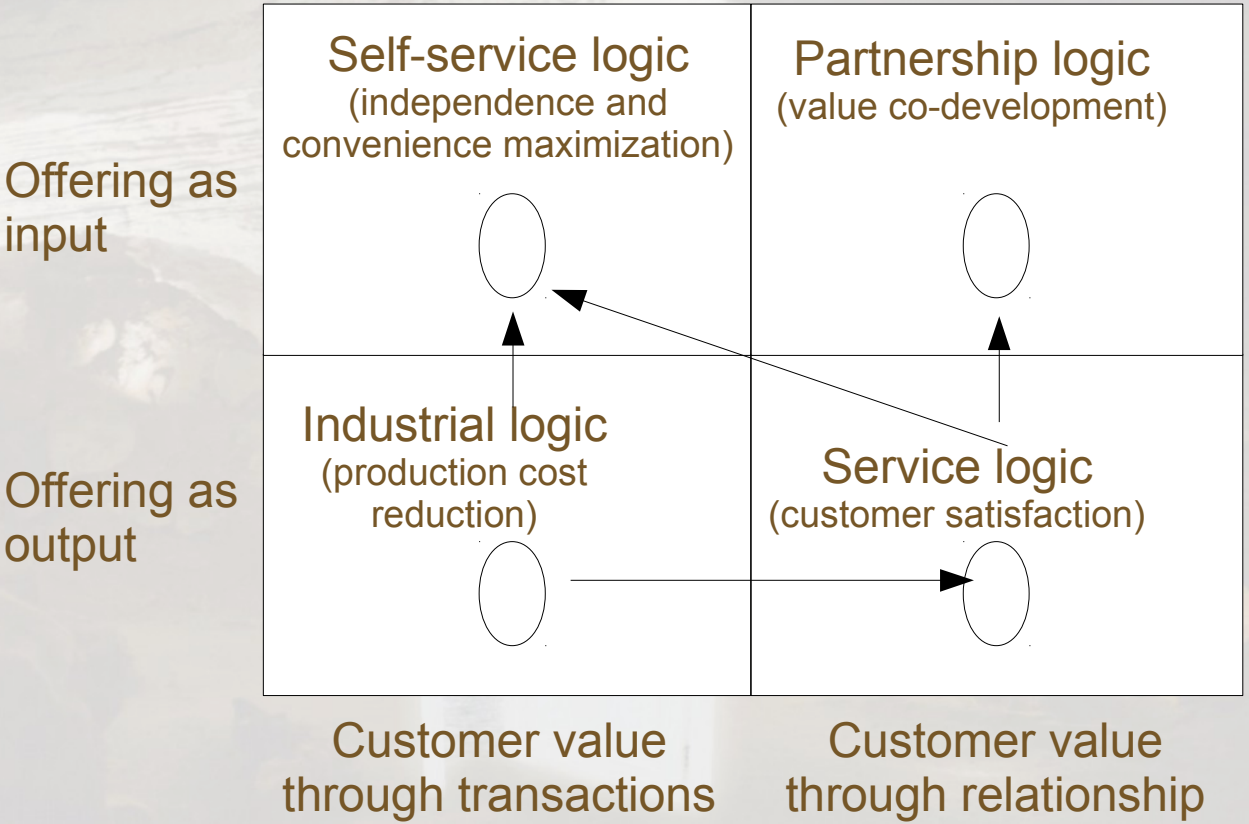
- Providers and customer mutually experience, and then improve

Extended from Normann, Richard, and Rafael Ramírez. 1989. “A Theory of the Offering: Toward a Neo-Industrial Business Strategy.” In *Strategy Organisation Design, and Human Resource Management*, edited by Charles C. Snow, 111–28. J.A.I. Press; + Kijima, Kyoichi, and Yusuke Arai. 2016. “Value Co-Creation Process and Value Orchestration Platform.” In *Global Perspectives on Service Science*: Japan, edited by Kwan, Spohrer, and Sawatani, 137–54, Springer.

Images from Flickr: “Pimp My Ride” CC-BY 2011 Grey World; “”Oaks and Spokes Bicycle Repair Repair Station” CC-BY 2015 Kristy Dactyle; “Bettter Bike Share” CC-BY 2015 Better Bike Share Partnershp

Theory of the offering sees coproduction with *input*, or *output*

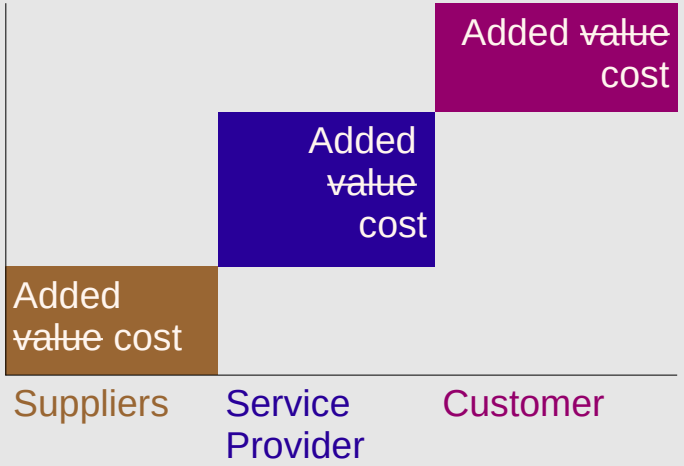




Rafael Ramirez and Johan Wallin. *Prime Movers: Define Your Business or Have Someone Define It Against You*, 2000, p. 141.

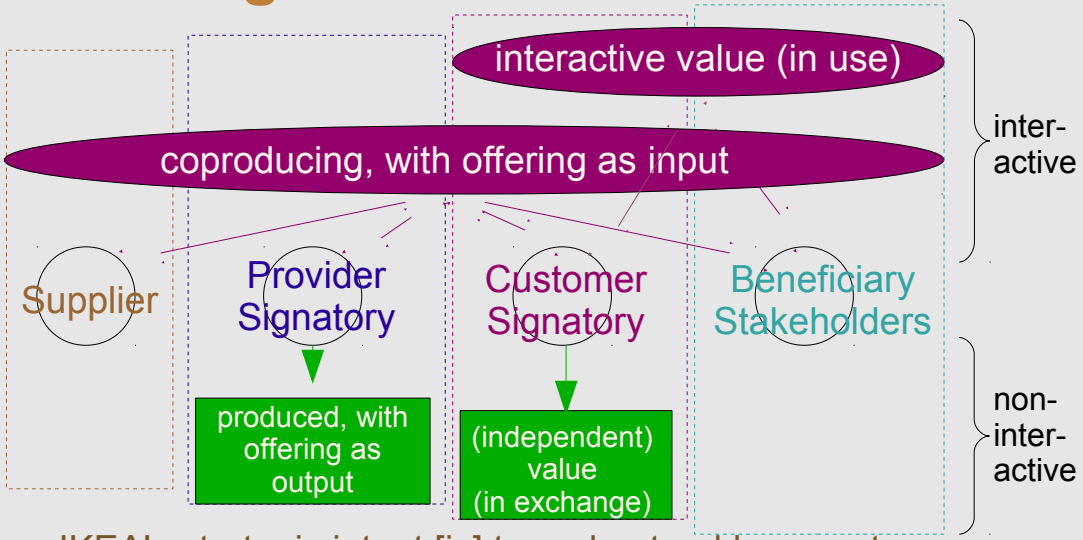
The theory of firms on “adding value” has turned to mobilizing interactive *value constellations*

Adding ~~value~~ cost



Our traditional about value … [says] every company occupies a position on the value chain. Upstream, suppliers provide inputs. The company then adds values to these inputs, before passing them downstream to then next actor in the chain [whether another business or the final consumer].

Enabling interactive value creation



… IKEA's strategic intent [is] to understand how customers can create their own value and create a business system that allows them to do it better. IKEA's goal is not to *relieve* customers of doing certain things but to *mobilize* them to do easily certain things they have never done before. Put another way, IKEA invents value by enabling customers' own value-creating activities. … Wealth is [the ability] to realize your own ideas.

Source: Richard Normann and Rafael Ramirez. 1993. “From Value Chain to Value Constellation: Designing Interactive Strategy.” Harvard Business Review 71: 65–65. http://hbr.org/1993/07/designing-interactive-strategy .

Lifelines co-respond with habit, agencing, and attentionality

Habit, rather than volition:

I become my walking, and that my walking walks me. I am there, inside of it, animated by its rhythm. And with every step I am not so much changed as modified, in the sense not of transition from one state to another but of perpetual renewal. [p. 16]

Agencing, rather than agency:

Interaction goes back and forth as agents, facing each other on opposite banks of the river, trade messages, missiles, and merchandise. But to *correspond*, in my terms, is to join with the swimmer in the midstream. It is a matter not of taking sides but of going along. [p. 18]

Attentionality, rather than intentionality:

Walking calls for the pedestrian's continual responsiveness to the terrain, the path, and the elements. To respond, he must attend to these things as he goes along, joining or participating with them in his own movements. [p. 19]

Ingold, Tim. 2017. "On Human Correspondence." *Journal of the Royal Anthropological Institute* 23 (1):9–27. https://doi.org/10.1111/1467-9655.12541.

Agenda

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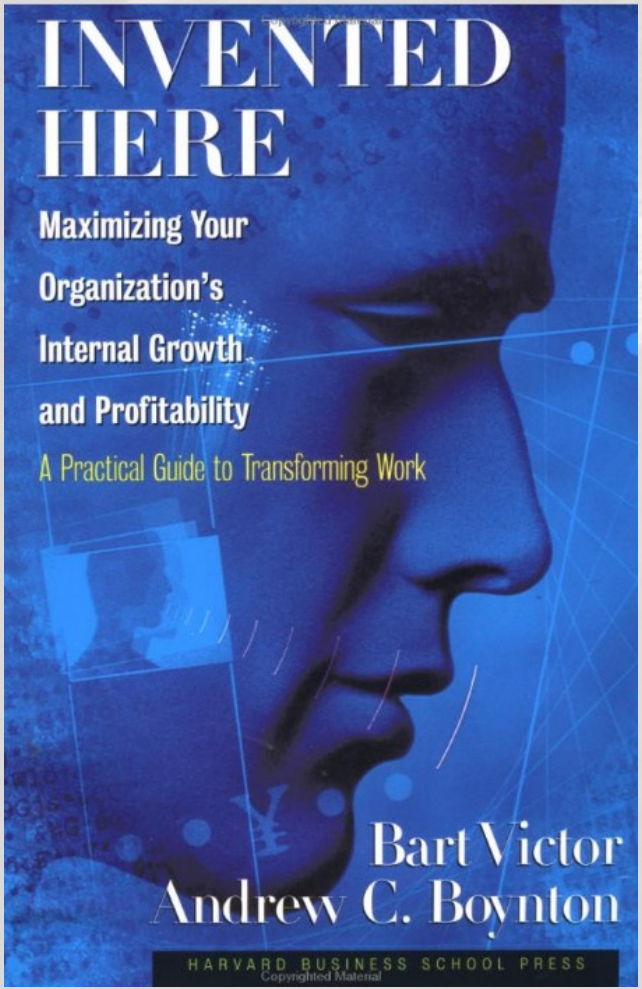
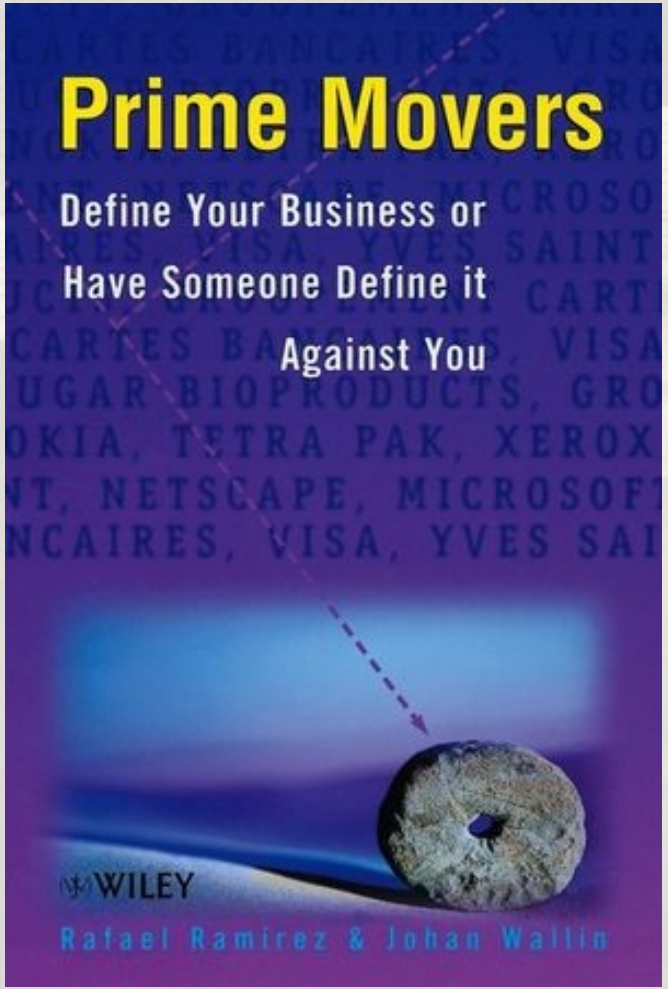
Appendix

Some books: dynamic stability; offerings and value constellation





Lacking history to study organizational learning circa 1995, videos and a book explored *How Buildings Learn*

1. How Buildings Learn - Stewart Brand - 1 of 6 -...
28,610 views • 2 years ago

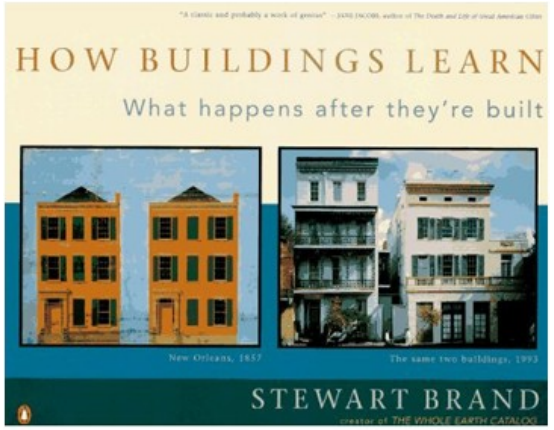
6. How Buildings Learn - Stewart Brand - 6 of 6 -...
10,888 views • 2 years ago

2. How Buildings Learn - Stewart Brand - 2 of 6 - "T...
8,386 views • 2 years ago

3. How Buildings Learn - Stewart Brand - 3 of 6 -...
7,432 views • 2 years ago

5. How Buildings Learn - Stewart Brand - 5 of 6 - "T...
4,345 views • 2 years ago

The Oak Beams of New College, Oxford
1,967 views • 2 years ago



Pacing layers emphasize coevolution and learning

SITE

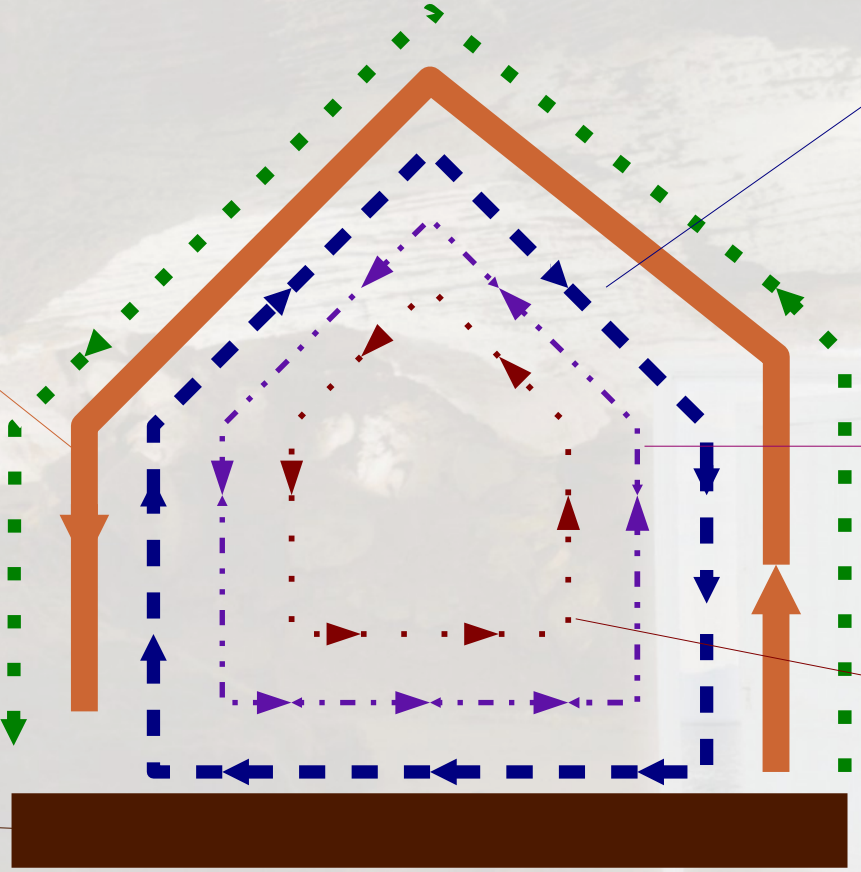
This is the geographical setting, the urban location, and the legally defined lot, whose boundaries outlast generations of ephemeral buildings. "Site is eternal", Duffy agrees.

STRUCTURE

The foundation and load-bearing elements are perilous and expensive to change, so people don't. These are the building. Structural life ranges from 30 to 300 years (but few buildings make it past 60, for other reasons).

SKIN

Exterior surfaces now change every 20 years or so, to keep up with fashion or technology, or for wholesale repair. Recent focus on energy costs has led to re-engineered Skins that are air-tight and better-insulated.



SERVICES

These are the working guts of a building: communications wiring, electrical wiring, plumbing, sprinkler system, HVAC (heating, ventilation, and air conditioning), and moving parts like elevators and escalators. They wear out or obsolesce every 7 to 15 years. Many buildings are demolished early if their outdated systems are too deeply embedded to replace easily.

SPACE PLAN

The interior layout, where walls, ceilings, floors, and doors go. Turbulent commercial space can change every 3 years; exceptionally quiet homes might wait 30 years.

STUFF

Chairs, desks, phones, pictures; kitchen appliances, lamps, hair brushes; all the things that twitch around daily to monthly. Furniture is called mobilia in Italian for good reason.

Source: Stewart Brand. 1994. *How Buildings Learn: What Happens after They're Built*. New York: Viking.

Systems Thinking Ontario

Upcoming Meetings

2018-06-20
2018-07-18
2018-08-15
2018-09-19
2018-10-17
2018-11-21

Past Meetings

2018-05-16
2018-04-18
2018-03-21
2018-02-21
2018-01-17
2017-11-15
2017-10-18
2017-09-20
2017-08-16
2017-07-19
2017-06-21
2017-05-17
2017-04-19
2017-03-15
2017-02-15
2017-01-18
2016-11-16
2016-10-19
2016-09-21
2016-08-17
2016-07-20
2016-06-15

HOME

Systems Thinking Ontario is an transdisciplinary group centered in Southern Ontario, with the premise that members might be within driving distance of Toronto, and might meet face-to-face. Think global, act local!

This public wiki (at http://wiki.st-on.org, or https://sites.google.com/site/systhinkon/) is a companion to the DISCUSSION GROUP at https://groups.google.com/d/forum/st-on (or shortcode http://bit.ly/st-on).

Our working definition of systems thinking is: understanding the world by exploring parts and wholes. We do this by simultaneously and iteratively using analysis (what parts does this whole contain) and synthesis (which wholes contain this part). For an opinion (not necessarily definitive) of the domain of interest, see "An Interview on Service Systems, Natural Systems", and systems sciences.

Upcoming meetings are listed in the sidebar navigation along with links to past meetings.

Some related local activities on Systems Thinking include:

- The Strongly Sustainable Business Model Group, in the OCADU Strategic Innovation Lab (connected with the Strategic Foresight and Innovation program)
- DGC2003: Systems Thinking for Global Problems, part of the Dynamics of Global Change Collaborative Program at U. of Toronto, May-June 2012;
- The Faculty of Environmental Studies, at York University; and
- The Sustainability Management program, in the G. Raymond Chang School of Continuing Education at Ryerson University.

Systems Thinking Ontario could become a chapter of the International Society for the Systems Sciences ... if the members decided that the group should do that. The most recent meeting of the ISSS in Ontario was at Waterloo 2010, preceded by Toronto 2000.

Artifacts from ISSS San Jose 2012 at available at http://isss.org/world/sanjose-2012-retrospective. Audio and video are accessible from http://media.isss.org , http://www.youtube.com/user/systemsmovement and http://itunes.apple.com/ca/podcast/isss-conference-audio/id552809318 . Remember that the primary intent of the group is, however, that we should meet face-to-face, upon occasion.

Systems Thinking Ontario is a spin-off from the Design With Dialogue community. The spirit of collaboration and open sharing aspires to the be same. The format and audience may be a little different.

Publications

Submitted by davidng on Sat, 12/17/2016 - 00:18

Publication Date	Publication Title	Author(s)	Form
July 2018	"A Systems Approach on Social Enterprise" [view abstract and presentation slides]	David Ing	workshop for the Agents of Change accelerator program, Centre for Social Innovation, Toronto, Ontario
May 2018	"Evolving Pattern Language towards an Affordance Language" [view abstract and presentation slides]	David Ing	presentation at IBM Research Almaden, San Jose, California
April 2018	"Innovation Learning for Sustainability: What is smarter for urban systems?" [view abstract and presentation slides]	David Ing	keynote presentation at International Conference on Smart Cities and Urban Design (SCUD 2018), Wuhan, PR China
March 2018	"Architecting for Wicked Messes: Towards an affordance language for service systems" [view abstract and presentation	David Ing	lecture at Master of Design in Strategic Foresight and Innovation, OCADU, Toronto

Recent content

- 2012/03/14 11:30 Beth Bechky, "Advocates for the evidence: Forensic science as boundary work" UCDavis, Rotman OBHR Speaker Series
  2 hours 18 minutes ago
- 2011/10/24 17:30 Ron Burt, "How Do Social Networks Create Competitive Advantage?", S. D. Clark Memorial Lecture, University of Toronto

If they can get you asking the wrong questions, they don't have to worry about answers (Thomas Pynchon)

Type **1** error	**False positive**: finding a (statistical) relation that isn't real
Type **2** error	**False negative**: missing a (statistical) relation that is real
Type **3** error	**Tricking ourselves**: Unintentional error of solving wrong problems precisely (through ignorance, faulty education or unreflective practice)
Type **4** error	**Tricking others**: Intentional error of solving wrong problems (through malice, ideology, overzealousness, self-righteousness, wrongdoing)

Ian I. Mitroff and Abraham Silvers. 2010. *Dirty Rotten Strategies: How We Trick Ourselves and Others into Solving the Wrong Problems Precisely.* Stanford University Press.

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Appendix

“Dilemmas in a General Theory of Planning”, (Rittel + Weber, 1973)

The kinds of problems that planners deal with -- societal problems – are inherently different from the problems that scientists and perhaps some classes of engineers deal with.

Planning problems are inherently wicked.

The problems that scientists and engineers have usually focused upon are mostly "**tame**" or "**benign**" ones.

As an example, consider a problem of mathematics, such as solving an equation; or the task of an organic chemist in analyzing the structure of some unknown compound; or that of the chessplayer attempting to accomplish checkmate in five moves.

For each the mission is clear.

It is clear, in turn, whether or not the **problems** have been solved.

Wicked problems, in contrast, have neither of these clarifying traits; and they include nearly all public policy issues – whether the **question** concerns the location of a freeway, the adjustment of a tax rate, the modification of school curricula, or the confrontation of crime.

There are at least **ten distinguishing properties** of planning-type problems, i.e. wicked ones ... We use the term “wicked” in a meaning akin to that of “malignant” (in contrast to “benign”) or “vicious” (like a circle) or “tricky” (like a leprechaun) or “aggressive” (like a lion, in contrast to the docility of a lamb).

Horst WJ Rittel, and Melvin M. Webber. 1973. “Dilemmas in a General Theory of Planning.” *Policy Sciences* 4 (2): 155–169. https://doi.org/10.1007/BF01405730.

Ten distinguishing properties of planning-type (wicked) problems (#1 - #5)

	Tame (benign) problems	*Wicked (malignant) problems*
1.	An **exhaustive formulation** can be stated containing all the information needed for understanding and solving the problem	There is **no definitive formulation** of a wicked problem.
2.	There are **criteria** that tell when *the* or *a* **solution has been found**.	Wicked problems have **no stopping rule**.
3.	There are conventionalized **criteria for objectively deciding** whether the offered solution is correct or false.	Solutions to wicked problems are not true-or-false, but **good or bad**.
4.	One can determine on the spot **how good a solution-attempt** has been.	There is no immediate and **no ultimate test** of a solution to a wicked problem
5.	The problem-solver can try various **experimental runs** without penalty.	Every solution to a wicked problem is a "**one-shot operation**"; because there is no opportunity to learn by trial and error, every attempt counts significantly.

Ten distinguishing properties of planning-type (wicked) problems (#6 - #10)

	Tame (benign) problems	*Wicked (malignant) problems*
6.	There are **criteria** which enable **proof** that **all solutions** have been **identified and considered**.	Wicked problems **do not have an enumerable** (or an exhaustively describable) **set of potential solutions**, nor is there a well-described.
7.	There might be **important classes** to know which type of solution to apply.	Every wicked problem is **essentially unique**.
8.	Small steps lead to overall improvement, through **incrementalism**.	Every wicked problem can be considered to be a **symptom of another problem**.
9.	Rules or procedures can determine the **"correct" explanation** or combination of them.	The existence of a **discrepancy** representing a wicked problem **can be explained in numerous ways**. The choice of explanation determines the nature of the problem's resolution.
10.	Science does **not blame** for postulating hypotheses that are later **refuted**.	The social planner has **no right to be wrong** (i.e., planners are liable for the consequences of the actions they generate)

A *mess* (or *problématique*) is a system of problems

The **optimal solution** of a model is not an optimal solution of a problem unless the model is a **perfect representation** of the problem. Therefore, in testing a model and evaluating solutions derived from it, the model itself should not be used to determine the relevant comparative performance measures.

All **models** are **simplifications of reality**. If this were not the case, their **usefulness** would be diminished. Therefore, it is critical to determine how well they represent reality.

… what the French call a ***problématique*** and I call a ***mess*** … is a **complex** and highly **dynamic system of interacting problems**.

Problems are elements abstracted from messes; therefore, problems are to messes what atoms are to planets. There is an important systems principle, familiar to all of you, that applies to messes and problems: that **the sum of the optimal solutions to each component problem considered separately is not an optimal solution to the mess**. This follows from the fact that the behavior of the mess depends more on how the solutions to its component problems interact than on how they act independently of each other.

The treatment of messes requires **more than problem solving**; it requires planning. Planning should consist of the design of a desirable future and invention or selection of ways of getting there. Therefore, it is **more** a matter of **synthesis**, of **design** and **invention** than it is of analysis, of programming and budgeting.

Ackoff, Russell L. 1977. “Optimization + Objectivity = Optout.” *European Journal of Operational Research* 1 (1): 1–7. https://doi.org/10.1016/S0377-2217(77)81003-5.

Complicated systems are rare; complex systems are the norm

The following is possibly the golden rule for distinguishing 'complex' from 'complicated' problems and systems.

Complicated problems
originate from **causes** that can be **individually distinguished**;
they can be **addressed piece-by-piece**;
for **each input** to the system there is a **proportionate output**;
the relevant systems can be **controlled** and
the problems they present admit **permanent solutions**.

… **complex problems and systems**
result from networks of **multiple interacting causes** that cannot be individually distinguished;
must be **addressed as entire systems**,
that is they cannot be addressed in a piecemeal way;
they are such that **small inputs** may result in **disproportionate effects**;
the problems they present **cannot be solved once and for ever**,
but require to be systematically managed and typically **any intervention merges into new problems** as a result of the interventions dealing with them; and
the **relevant systems cannot be controlled** ...

... decision-makers ask their consultants ... to **treat complex problems as if they were complicated** ones. Complexity and the nature of contemporary science show that the claim to 'solve' (complex) problems is often ungrounded. **'Learning to dance**' with a complex system is definitely **different from 'solving' the problems** arising from it.

Poli, Roberto. 2013. "A Note on the Difference Between Complicated and Complex Social Systems." *Cadmus Journal* 2 (1). http://www.cadmusjournal.org/node/362.

Types of systems can be categorized by purposefulness

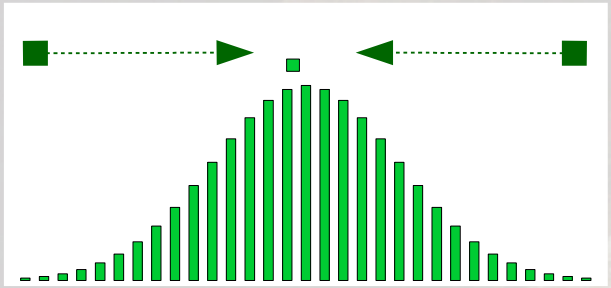
Systems and models	*Parts*	*Wholes*
Deterministic	Not purposeful	Not purposeful
Animated	Not purposeful	Purposeful
Social	Purposeful	Purposeful
Ecological	Purposeful	Not purposeful

Purposive == goal-seeking	*Goals*: those ends that we can expect to attain within the period covered by planning.
	Objectives: those ends that we do not expect to attain within the period planned for but which we hope to attain later, and toward which we believe progress is possible within the period planned for.
Purposeful == ideal-seeking	*Ideals*: those ends that are believed to be unattainable but towards which we believe progress is possible during and after the period planned for.

Ackoff, Russell L., and Jamshid Gharajedaghi. 1996. "Reflections on Systems and Their Models." Systems Research 13 (1): 13–23. https://doi.org/10.1002/(SICI)1099-1735(199603)13:1<13::AID-SRES66>3.0.CO;2-O.

An inquiring system is a way of knowing for human beings

Inductive-Consensual IS: The first way (on *objective* views)



guarantor = **agreement** (consensus)

e.g. Delphi approach

Analytic-Deductive IS: The second way (on *objective* views)

guarantor = **logical consistency** (fact nets)

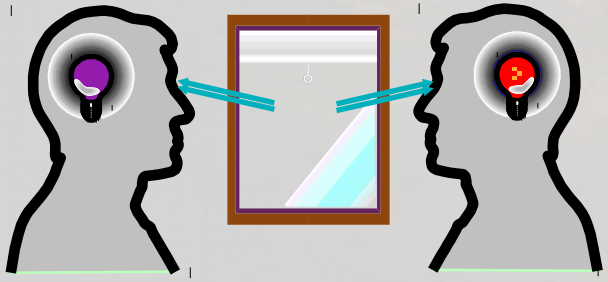
e.g. the "best man" for the job

Objective
Agreed Criteria
a. attribute
b. attribute
c. attribute

Rank	9

Scorecard	
a. attribute	9
b. attribute	7
c. attribute	6

Multiple Realities IS: The third way (on *subjective* views)



model + data as inseparable whole

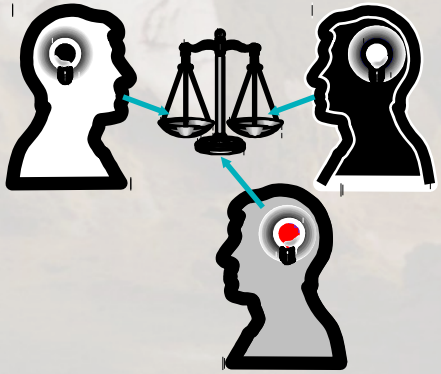
guarantor = **ability to see range of views** (representations)

e.g. disciplinary views of drug problem

Dialectic IS: The fourth way (on *subjective* views)

guarantor = **conflict**

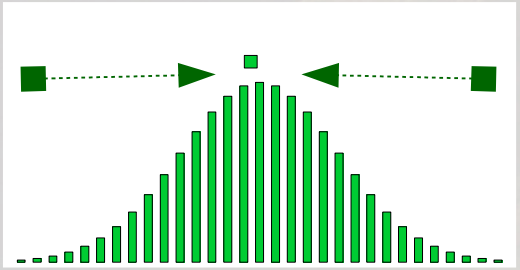
e.g. challenging assumptions of what skid row housing should be



Mitroff, Ian I., and Harold A. Linstone. 1993. *The Unbounded Mind: Breaking the chains of traditional business thinking*. Oxford University Press.

A systems approach sweeps in across 4 modes of knowing

John Locke (1632-1704)



Gottfried Wilhelm Leibniz (1646-1712)

Objective		Rank	9
Agreed Criteria		**Scorecard**	
a. attribute		a. attribute	9
b. attribute		b. attribute	7
. attribute		c. attribute	6

The fifth way of knowing

Systems Approach

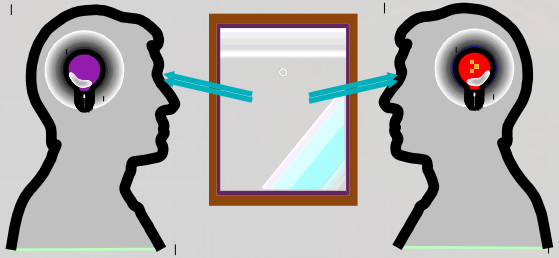
(with multiple perspectives)

guarantor = **progress**

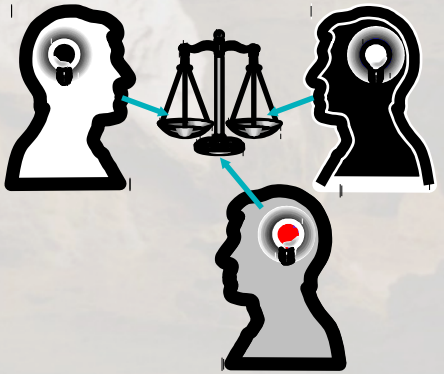
(sweeping-in process)

Edgar Arthur Singer (1973-1954)

C. West Churchman (1913-2004)



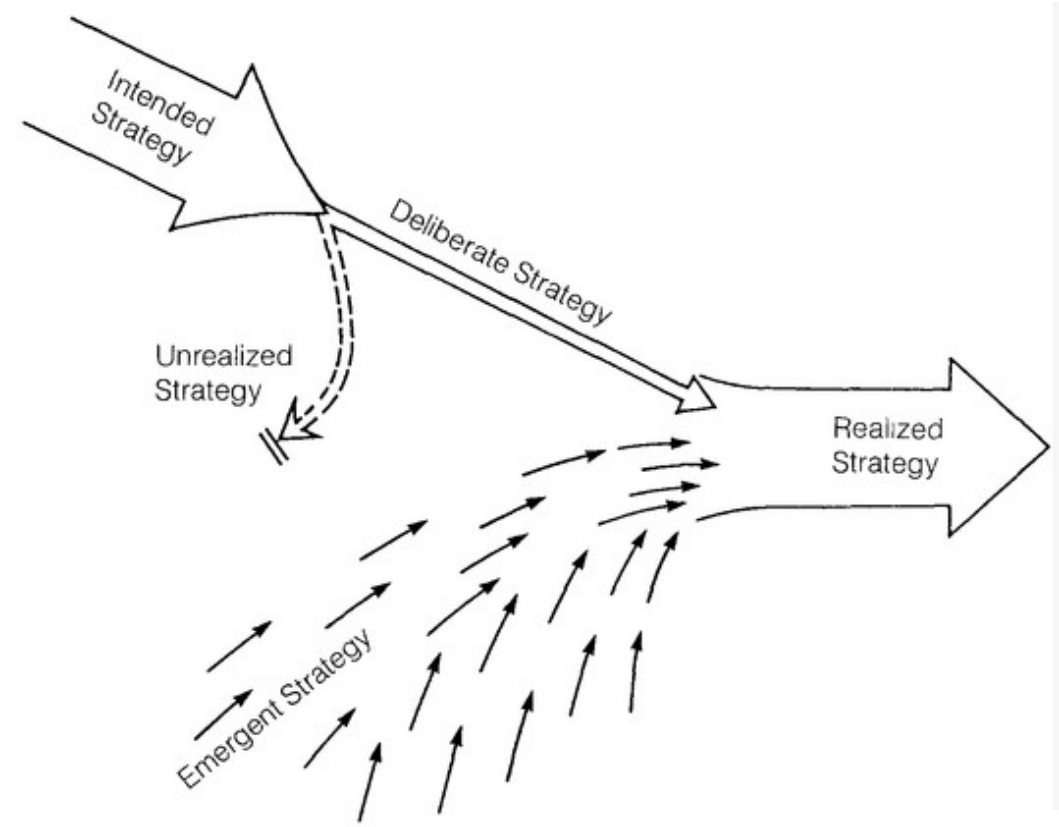
Immanuel Kant (1725-1804)



Georg Wilhelm Friedrich Hegel (1770-1831)

Mitroff, Ian I., and Harold A. Linstone. 1993. *The Unbounded Mind: Breaking the chains of traditional business thinking*. Oxford University Press.

“strategy is a pattern – specifically, a pattern in a stream of actions” (Mintzberg 1987)



Intended action ~ realized behaviour

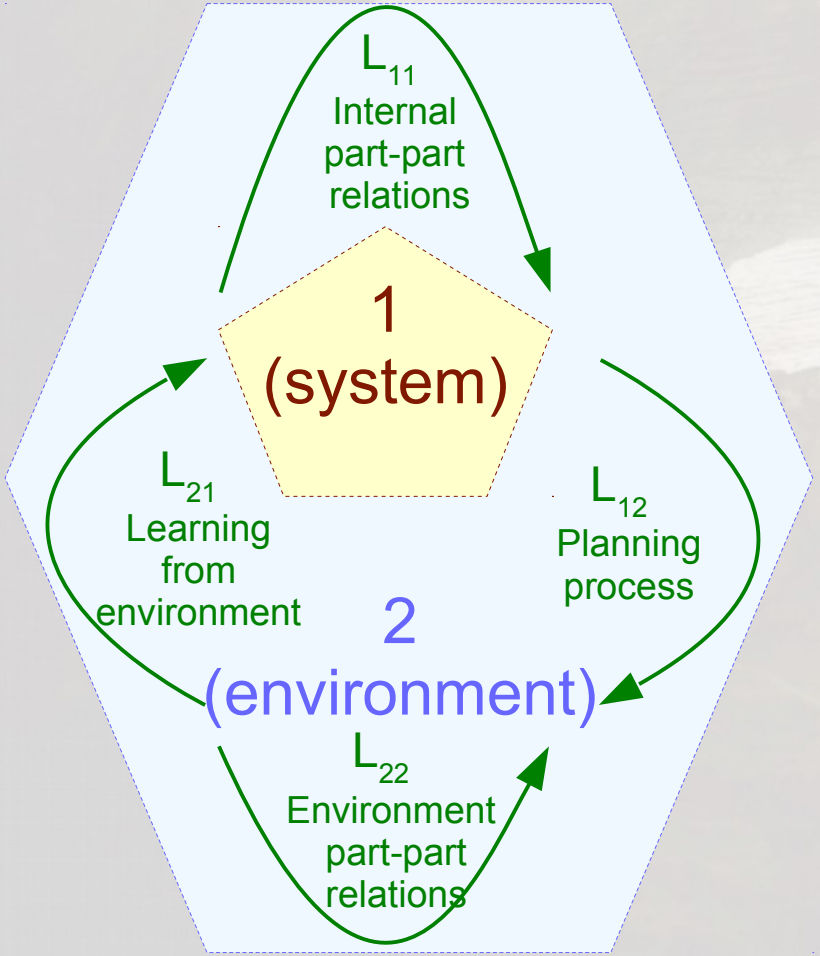
Intended plan
- Deliberate action

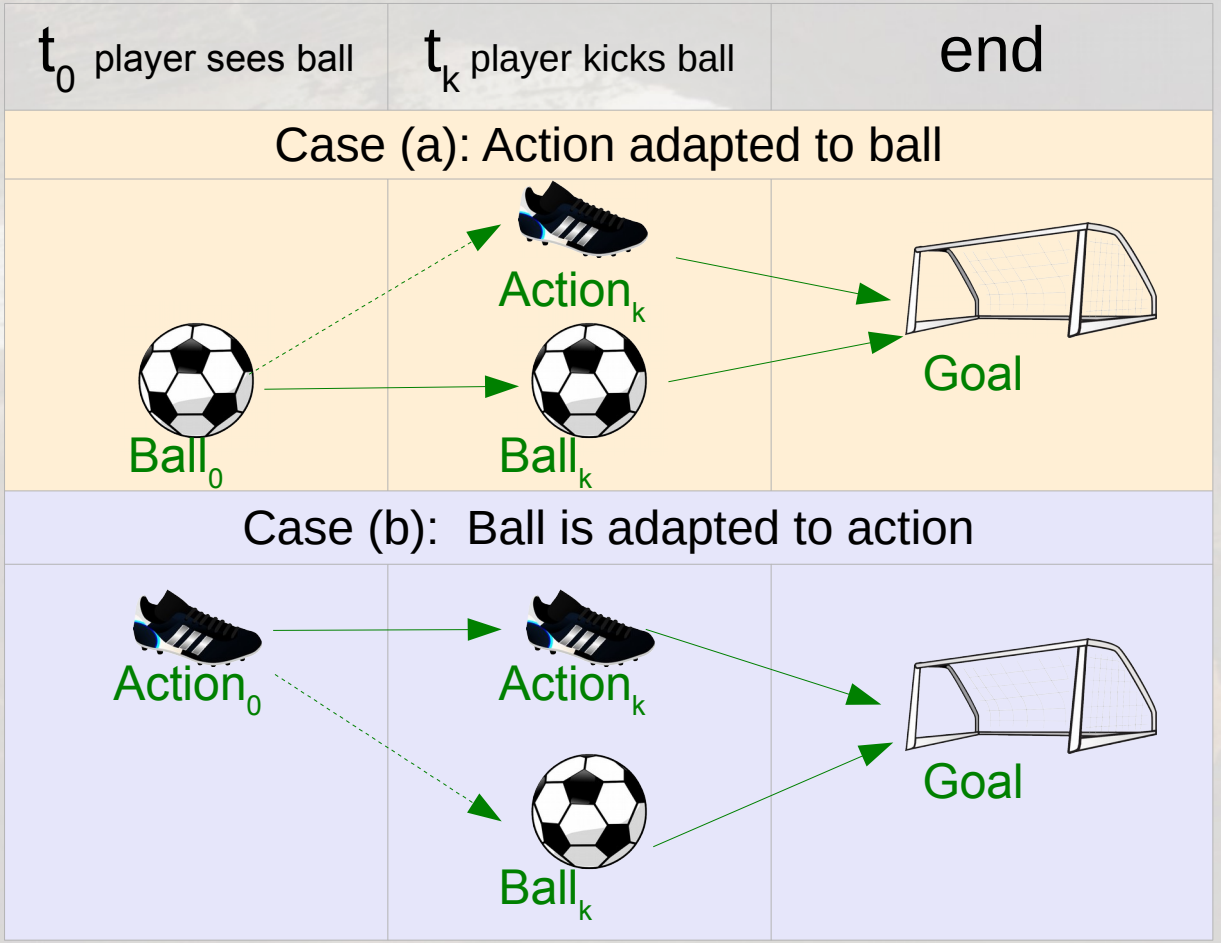
Inaction or misguided execution
- Unrealized plans

From or despite preconceived intentions
- Emergent action

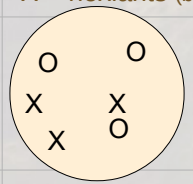
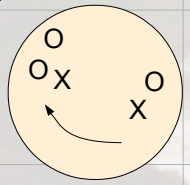
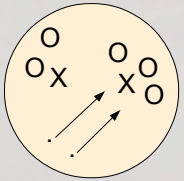
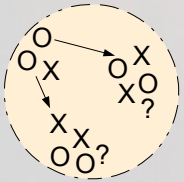
Source: Henry Mintzberg. 1987. The Strategy Concept I: Five Ps For Strategy. *California Management Review* 30, 1 (1987), 11–24. DOI:10.2307/41165263

Open systems (Emery and Trist), directive correlation (Sommerhoff)





The Causal Texture of Social Environments – Extended fields of directive correlations (Emery and Trist)

	Where O = goals (goodies), X = noxiants (baddes)		Elements to know	Ideals	Forms of learning	Forms of planning
Type I. Random Placid		Goals and noxiants randomly distributed. Strategy is tactic. "Grab it if it's there". Largely theoretical of micro, design, e.g. concentration camps, conditioning experiments. Nature is not random.	system	Homonomy – sense of belonging	conditioning	tactics
Type 2. Clustered Placid		Goals and noxiants are lawfully distributed – meaningful learning. Simple strategy – maximize goals, e.g. use fire to produce new grass. Most of human span spent in this form. Hunting, gathering, small village. What people mean by the "good old days".	system, action	Nurturance – caring for	meaningful	tactics / strategies
Type 3. Disturbed Reactive		Type 2 with two or more systems of one kind *competing* for the same resources. Operational planning emerges to out-manoeuvre the competition. Requires extra knowledge of both Ss and E. E is stable so start with a set of givens and concentrate on problem solving for win-lose games. Need to create insturments that are variety-reducing (foolproof) – elements must be standardized and interchangeable. Birth of bureacractic structures where people are redundant parts. Concentrate power at the top – strrategy becomes a power game.	system, action, learning	Humanity – in broadest sense	problem solving	tactics / operational strategies
Type 4. Turbulent		Dynamic, not placid/stable. Planned change in type 3 triggers off unexpected social processes. Dynamism arises from the field itself, creating unpredictability and increasing *relevant uncertainty* and *its continuities*. Linear planning impossible, e.g. whaling disrupted reproduciton, people react to being treated as parts of machine. Birth of open systems thinking, ecology, and catastrophe theory.	system, action, learning, environment	Beauty – includes fitting together naturally	puzzle-solving	active adaptive planning

Agenda

A. Outline + introductions

B. Learning-by-trying (in a timebox): Multiple Perspectives Learning

C. Continuing our learning
Appendix

1. An exercise: a dockless bike sharing system
2. Architecting, designing, learning
3. Systems basics
4. Dynamic stability (positioning), voices, affording values
5. Offerings, value constellations, co-responding